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We start with the equation

$$\frac{2^x+10}{4}=\frac{9}{x^{\,x-2}},$$

and our goal is to find the sum of all real solutions x.

Step 1. Clear the Denominators

Multiply both sides by $4\,x^{\,x-2}$ (noting that for a real solution we must have $x>0$ so that the expression is defined):

$$\bigl(2^x+10\bigr)\,x^{\,x-2}=36.$$

Step 2. Analyze the Function

Define

$$f(x)=\bigl(2^x+10\bigr)\,x^{\,x-2}.$$

We want the values of x for which $f(x)=36$.

Behavior as $x\to 0^+$

When $x\to 0^+$, note that

$$x^{\,x-2}=x^x\cdot x^{-2}.$$

Since $x^x\to 1$ as $x\to 0^+$ and $x^{-2}\to +\infty$, we have

$$f(x)\to (2^x+10)\cdot\infty\to +\infty.$$

Behavior at $x=1$ and $x=2$

- At $x=1$:
  - $2^1+10=2+10=12$,
  - $1^{1-2}=1^{-1}=1$,
  - so $f(1)=12$.
- At $x=2$:
  - $2^2+10=4+10=14$,
  - $2^{2-2}=2^0=1$,
  - so $f(2)=14$.

Thus, as x increases from 0^+ to 1, $f(x)$ drops from $+\infty$ to 12. Then from $x = 1$ to higher values, $f(x)$ eventually increases again (as the factor 2^x and the rising exponent x^{x-2} take over).

Since

- $f(x) \to +\infty$ as $x \to 0^+$,
- $f(1) = 12 < 36$,
- and for larger x (for example, $f(3) = (2^3 + 10) \cdot 3^1 = 18 \cdot 3 = 54 > 36$,

by the Intermediate Value Theorem there must be **two** solutions: one in $(0, 1)$ and another in $(1, 3)$.

Step 3. Find Approximate Solutions

Using numerical methods (or a calculator) one finds:

- **First solution:** $x \approx 0.471$
- **Second solution:** $x \approx 2.755$

Step 4. Sum the Solutions

The sum of the two solutions is approximately

$$0.471 + 2.755 \approx 3.226.$$

Rounded to two decimal places, the sum is about **3.23**.

Final Answer

The sum of all solutions of the given equation is approximately **3.23**.

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